

What is claimed is:

1. A snowmobile comprising:

a longitudinally extending chassis having a front portion and a rear portion, the

5 chassis supporting a liquid-cooled engine proximate the front portion and

an operator seat proximate the rear portion, the engine including coolant

passages for carrying liquid coolant that absorbs heat generated by the

engine during operation, the engine powering a drive track operatively

connected to the chassis proximate the rear portion, the chassis front

10 portion mounting a pair of steerable skis and supporting a body assembly,

the body assembly containing the engine and a heat exchanger, the heat

exchanger housed within the body assembly, connected in fluid

communication with the engine coolant passages, and adapted to dissipate

heat from the liquid coolant, the body assembly having airflow inlet

15 openings and outlet apertures for allowing ambient air into and out of the

body assembly and in contact with the heat exchanger, the body assembly

formed by an upwardly open nosepan covered by a hood, the heat

exchanger contained within the nosepan.

- 20 2. The snowmobile of claim 1, wherein the heat exchanger is contained completely within the nose pan.

3. The snowmobile of claim 1, wherein the heat exchanger is located forward of the engine.

4. A snowmobile comprising:

a longitudinally extending chassis having a front portion and a rear portion, the chassis supporting a liquid-cooled engine proximate the front portion and an operator seat proximate the rear portion, the engine including coolant passages for carrying liquid coolant that absorbs heat generated by the engine during operation, the engine powering a drive track operatively connected to the chassis proximate the rear portion, the chassis front portion mounting a pair of steerable skis and supporting a body assembly, the body assembly containing the engine and a heat exchanger, the heat exchanger housed within the body assembly, connected in fluid communication with the engine coolant passages, and adapted to dissipate heat from the liquid coolant, the body assembly having airflow inlet openings and outlet apertures for allowing ambient air into and out of the body assembly and in contact with the heat exchanger, the body assembly formed by an upwardly open nosepan covered by a hood, the heat exchanger located forward of the engine.

5. The snowmobile of claim 4, wherein the heat exchanger is contained within the nose pan.

6. A snowmobile comprising:

a longitudinally extending chassis having a front portion and a rear portion, the chassis supporting a liquid-cooled engine proximate the front portion and an operator seat proximate the rear portion, the engine including coolant

5 passages for carrying liquid coolant that absorbs heat generated by the
engine during operation, the engine powering a drive track operatively
connected to the chassis proximate the rear portion, the chassis front
portion mounting a pair of steerable skis and supporting a body assembly,
the body assembly containing the engine and a heat exchanger, the heat
exchanger housed within the body assembly, connected in fluid
communication with the engine coolant passages, and adapted to dissipate
heat from the liquid coolant, the body assembly having airflow inlet
openings and outlet apertures for allowing ambient air into and out of the
10 body assembly and in contact with the heat exchanger, the body assembly
formed by an upwardly open nosepan covered by a hood, the heat
exchanger and the engine each defining a center of mass, the heat
exchanger center of mass below the engine center of mass.

- 15 7. The snowmobile of claim 6, wherein the heat exchanger center of mass is below a belt
line of the snowmobile.
8. The snowmobile of claim 6, wherein the heat exchanger is positioned at least one inch
below the engine center of mass.
- 20 9. The snowmobile of claim 6, wherein the heat exchanger is located forward of the engine.
10. A snowmobile comprising:

a longitudinally extending chassis having a front portion and a rear portion, the chassis supporting a liquid-cooled engine proximate the front portion and an operator seat proximate the rear portion, the engine including coolant passages for carrying liquid coolant that absorbs heat generated by the engine during operation, the engine powering a drive track operatively connected to the chassis proximate the rear portion, the chassis front portion mounting a pair of steerable skis and supporting a body assembly, the body assembly containing the engine and a heat exchanger, the heat exchanger housed within the body assembly, connected in fluid communication with the engine coolant passages, and adapted to dissipate heat from the liquid coolant, the body assembly having airflow inlet openings and outlet apertures for allowing ambient air into and out of the body assembly and in contact with the heat exchanger, the body assembly formed by an upwardly open nosepan covered by a hood, the engine having intake and exhaust pipe systems, the exhaust pipe system including an exhaust headpipe, the heat exchanger being below the exhaust headpipe, the heat exchanger being forward of the rear of the engine.

11. The snowmobile of claim 10, wherein the heat exchanger is mounted below an elbow in the exhaust pipe system.

12. The snowmobile of claim 10, the heat exchanger is directly under the elbow in the exhaust pipe system.

13. A snowmobile comprising:

a longitudinally extending chassis having a front portion and a rear portion, the chassis supporting a liquid-cooled engine proximate the front portion and an operator seat proximate the rear portion, the engine including coolant passages for carrying liquid coolant that absorbs heat generated by the engine during operation, the engine powering a drive track operatively connected to the chassis proximate the rear portion, the chassis front portion mounting a pair of steerable skis and supporting a body assembly, the body assembly containing the engine and a heat exchanger, the heat exchanger housed within the body assembly, connected in fluid communication with the engine coolant passages, and adapted to dissipate heat from the liquid coolant, the body assembly having airflow inlet openings and outlet apertures for allowing ambient air into and out of the body assembly and in contact with the heat exchanger, the body assembly formed by an upwardly open nosepan covered by a hood, the airflow outlet aperture being in the nosepan, whereby air flowing out the outlet aperture during forward movement of the snowmobile is not directed upwardly rearward towards the operator.

14. The snowmobile of claim 13, wherein the pair of steerable skis mount to the chassis front portion through respective suspension well openings in the nosepan, the outlet aperture defined by the suspension well openings.

15. The snowmobile of claim 14, wherein the airflow out the outlet aperture during forward movement of the snowmobile flows rearward around the drive track under running boards on the snowmobile.
- 5 16. The snowmobile of claim 13, wherein the outlet aperture is located proximate a bottom surface of the nosepan, whereby ambient air flowing out of the body assembly flows rearward around the drive track under running boards on the snowmobile..
- 10 17. The snowmobile of claim 13, wherein air flowing out the outlet aperture during forward movement of the snowmobile flows rearward around the drive track under running boards on the snowmobile.
18. The snowmobile of claim 13, wherein the radiator is located forward of the outlet aperture.
- 15 19. The snowmobile of claim 13, wherein the outlet aperture is at least one square inch.
20. A snowmobile comprising:
a longitudinally extending chassis having a front portion and a rear portion, the
20 chassis supporting a liquid-cooled engine proximate the front portion and
an operator seat proximate the rear portion, the engine including coolant
passages for carrying liquid coolant that absorbs heat generated by the
engine during operation, the engine powering a drive track operatively

connected to the chassis proximate the rear portion, the chassis front
portion mounting a pair of steerable skis and supporting a body assembly,
the body assembly containing the engine and a heat exchanger, the heat
exchanger housed within the body assembly, connected in fluid
5 communication with the engine coolant passages, and adapted to dissipate
heat from the liquid coolant, the body assembly having airflow inlet
openings and outlet apertures for allowing ambient air into and out of the
body assembly and in contact with the heat exchanger, the body assembly
formed by an upwardly open nosepan covered by a hood, the airflow inlet
10 opening being in the nosepan.

21. The snowmobile of claim 20, wherein the inlet opening is located towards the front of the
nosepan.

15 22. The snowmobile of claim 20, the inlet opening is located forward of the heat exchanger.

23. A snowmobile comprising:

a longitudinally extending chassis having a front portion and a rear portion, the
chassis supporting a liquid-cooled engine proximate the front portion and
an operator seat proximate the rear portion, the engine including coolant
20 passages for carrying liquid coolant that absorbs heat generated by the
engine during operation, the engine powering a drive track operatively
connected to the chassis proximate the rear portion, the chassis front

portion mounting a pair of steerable skis and supporting a body assembly,
the body assembly containing the engine and a heat exchanger, the heat
exchanger housed within the body assembly, connected in fluid
communication with the engine coolant passages, and adapted to dissipate
5 heat from the liquid coolant, the body assembly having airflow inlet
openings and outlet apertures for allowing ambient air into and out of the
body assembly, one or more of the airflow inlet openings in contact with
the heat exchanger, the body assembly including a first airflow inlet
opening allowing ambient air into a first cavity within the body assembly,
10 the first cavity containing the heat exchanger, the ambient air entering the
first cavity through the first airflow inlet opening not contacting the
engine.

24. The snowmobile of claim 23, further comprising a second airflow inlet opening, the
15 second airflow inlet opening allowing ambient air into one of the first cavity and a second
cavity.

25. The snowmobile of claim 24, wherein the first airflow inlet opening is positioned lower
on the body assembly than the second airflow inlet opening.

20 26. The snowmobile of claim 24, wherein the body assembly is formed by an upwardly open
nosepan covered by a hood, wherein the first airflow inlet opening is in the nosepan and
the second airflow inlet opening is in the hood.

27. The snowmobile of claim 24, wherein the second cavity contains the engine, whereby ambient air entering the second cavity through the second airflow inlet opening does not contact the heat exchanger.

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28. The snowmobile of claim 24, wherein the first and second cavities have separate airflow outlet apertures in the body assembly.

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29. The snowmobile of claim 24, further comprising a divider that separates the first cavity from the second cavity within the body assembly.

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30. The snowmobile of claim 29, wherein the divider directs the ambient air entering the first air inlet opening into the first cavity and directs the ambient air entering the second air inlet opening into one of the first and second cavities.

31. The snowmobile of claim 29, wherein the divider is adjustable so as to change effective volumes of the first and second cavities.

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32. The snowmobile of claim 29, wherein the divider is adjustable about a hinge.

33. A recreational or utility vehicle, comprising:

a longitudinally extending chassis having a front portion and a rear portion, the chassis supporting a liquid-cooled engine, the engine including coolant

5 passages for carrying liquid coolant that absorbs heat generated by the engine during operation, the chassis supporting a body assembly, the body assembly containing the engine and a heat exchanger, the heat exchanger housed within the body assembly, connected in fluid communication with the engine coolant passages, and adapted to dissipate heat from the liquid coolant, the body assembly including first and second airflow inlet openings that are exposed to airflow when the vehicle is in motion, the first airflow inlet opening allowing ambient air into a first cavity within the body assembly, the first cavity containing the heat exchanger, the ambient air entering the first cavity through the first airflow inlet opening not contacting the engine, the first cavity separated from a second cavity within the body assembly, the second cavity containing the engine, ambient air entering the second cavity not contacting the heat exchanger, the second airflow inlet opening allowing ambient air into one of the first and second cavities.

34. The vehicle of claim 33, wherein the body assembly is located proximate the front portion of the chassis and an operator seat proximate the rear portion of the chassis.

20 35. The vehicle of claim 33, further comprising a divider that separates the first cavity from the second cavity within the body assembly.

36. The vehicle of claim 35, wherein the divider is adjustable so as to change effective volumes of the first and second cavities.

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